CLAIMS

1. A projectile sealing arrangement for a barrel assembly of a weapon wherein a plurality of projectile assemblies are axially disposed in abutting relationship within a barrel, each projectile assembly associated with a discrete propellant charge; said sealing arrangement comprising:

a rearward opening communicating with a cavity provided in each projectile assembly for containing the discrete propellant charge; and

a forward portion of an abutting projectile assembly arranged for operative sealing engagement with the rearward opening;

the arrangement being such that, during application of a compressive load to abutting projectile assemblies, the discrete propellant charge is sealed within the cavity.

2. The projectile sealing arrangement of claim 1 wherein the forward portion of each projectile assembly has a forward sealing surface of a predetermined shape, and the rearward opening has a rearward sealing surface of a complementary shape to the predetermined shape of the forward sealing surface.

3. The projectile sealing arrangement of claim 1 wherein either or both of the forward portion and the rearward opening include a sealing means to aid or enhance sealing.

4. The projectile sealing arrangement of claim 3 wherein the sealing means is pre-formed as a resilient body.

5. The projectile sealing arrangement of claim 3 wherein the sealing means is formed in-situ through the use of a suitable sealing material.

6. The projectile sealing arrangement of either claim 4 or claim 5 wherein said sealing means has adhesive properties.

7. The projectile sealing arrangement of claim 1 wherein the sealing surfaces include planar surface portions.

8. The projectile sealing arrangement of claim 1 wherein the sealing surfaces include hemispherical shaped surface portions.

9. The projectile sealing arrangement of claim 1 wherein the sealing surfaces include conical shaped surface portions.

10. The projectile sealing arrangement of any one of claims 7 to 9 wherein shapes of said sealing surfaces are dictated by aerodynamic considerations.

11. A barrel assembly for a weapon; said barrel assembly including:

a plurality of projectile assemblies axially disposed in abutting relationship within a barrel, each projectile assembly having a head portion and a tail portion and is associated with a discrete propellant charge;

ignition means for each propellant charge, whereby the discrete propellant charges may be selectively ignited to propel respective projectiles sequentially from the barrel; and

a sealing arrangement between abutting projectile assemblies, said sealing arrangement comprising:

a rearward opening communicating with a cavity provided in the body of each projectile assembly for receiving the discrete propellant charge; and

a forward portion of an abutting projectile arranged for operative sealing engagement with the rearward opening;

the sealing arrangement being such that, during the application of a compressive load to the abutting projectile assemblies, the discrete propellant charges for trailing projectiles are sealed within their respective cavities.

12. The barrel assembly of claim 11 wherein the projectile body includes a transverse surface on at least one of the head and tail portions of the projectile assemblies, which transverse surface is arranged to prevent over-travel of a

projectile relative to a trailing projectile upon application of an axial compressive load to said plurality of projectiles.

13. The barrel assembly of claim 11 wherein propellant charges are in solidified form.

14. The barrel assembly of claim 11 wherein propellant charges are in a flowable form.

15. The barrel assembly of either claim 13 or claim 14 wherein the rearward opening includes a closure for retaining the propellant material within the cavity.

16. The barrel assembly of claim 15 wherein the closure comprises a burstable disc or a disc composed of combustible material.

17. The barrel assembly of claim 16 wherein said closure includes retaining means for releasable engagement with complementary retaining means on the head portion of an adjacent projectile assembly.

18. The barrel assembly of claim 17 wherein said complementary retaining means include a socket member and a spigot member.

19. The barrel assembly of claim 17 wherein said complementary retaining means include cooperating screw threads to facilitate release.

20. The barrel assembly of claim 17 wherein the retaining means is frangible.

21. A projectile assembly having a body with a head and a tail portion, said projectile assembly characterised in that:

the head includes a forward portion arranged for operative sealing engagement with the rearward opening of a leading projectile;

the tail portion includes a rearward opening communicating with a cavity provided in the projectile assembly for receiving the discrete propellant charge, which opening includes a rear portion arranged for operative sealing engagement with the forward portion of a trailing projectile; and

a sealing arrangement being such that, during the application of a compressive load to abutting projectile assemblies, the discrete propellant charge is sealed within the cavity.

22. A projectile sealing arrangement including at least two projectiles coupled together by a frangible coupling to form a chain, wherein: each projectile has a head portion, a tail portion and a propellant charge, the tail portion of the leading projectile and the head portion of the trailing projectile form a seal around the propellant charge of the leading projectile, and the coupling includes retaining means disposed between the tail portion of a leading projectile and the head portion of a trailing projectile.

23. A sealing arrangement according to claim 22 wherein the seal includes contact between complementary surfaces on the leading and trailing projectiles.

24. A sealing arrangement according to claim 22 or 23 wherein the seal includes an adhesive connection between the leading and trailing projectiles.

25. A sealing arrangement according to claim 22, 23 or 24 wherein the retaining means includes a threaded connection between the leading and trailing projectiles.

26. A sealing arrangement according to claim 22, 23 or 24 wherein the retaining means includes an adhesive connection between the leading and trailing projectile.

27. A chain of projectiles including at least two projectiles coupled together by a frangible coupling, wherein each projectile has a head portion, a tail portion and a sealed propellant charge, and the coupling includes retaining means disposed between the tail portion of a leading projectile and the head portion of a trailing projectile.

28. A chain as in claim 27 wherein the retaining means includes complementary spigot means and socket means engaged together.

29. A chain as in claim 28 wherein the spigot means and socket means are threaded together.

30. A chain as in claim 28 or 29 wherein the spigot means and socket means are provided on the trailing and leading projectiles respectively.

31. A chain as in claim 28, 29 or 30 wherein either the spigot or the socket is frangible.

32. A chain as in claim 27 wherein the retaining means includes adhesive between the trailing and leading projectiles.

33. A chain as in at least one of the claims 27 to 32 wherein the coupling is broken by combustion of the propellant charge in the leading projectile.

34. A chain as in at least one of the claims 27 to 33 wherein the propellant charge is contained in the tail portion of the leading projectile and provides part of the retaining means.

35. A chain as in claim 34 wherein the retaining means includes a socket formed in the propellant charge.

36. A chain as in at least one of the claims 27 to 35 formed as a substantially rigid linear arrangement of projectiles with a frangible coupling between each pair of adjacent projectiles.

37. A chain as in at least one of the claims 27 to 36 wherein each projectile is an assembly of separate components.

38. A chain as in at least one of the claims 27 to 37 wherein the tail portion of the leading projectile and the head portion of the trailing projectile have complementary surfaces that make contact to form a seal around the propellant charge in the leading projectile.

39. A chain as in at least one of the claims 27 to 38 wherein all of the projectiles are substantially identical.

40. A chain as in at least one of the claims 27 to 39 wherein the propellant charge in each projectile is ignitable to propel the respective projectile from the barrel of a weapon.

41. A projectile for a chain of projectiles, having a head portion, a tail portion and a propellant charge, the head and tail portions having sealing means that form respective propellant seals, and having retaining means that form respective frangible couplings, when joined together with a tail portion or a head portion of a leading or trailing projectile in the chain.

42. A projectile according to claim 41 wherein the retaining means includes a spigot in the head portion and a socket in the tail portion.

43. A projectile according to claim 42 wherein either the spigot or the socket is frangible.

44. A projectile according to one of the claims 41 to 42 wherein the retaining means of adjacent projectiles are threaded together.

45. A projectile as in one of the claims 41 to 44 wherein each coupling is frangible by virtue of combustion of the propellant charge in the leading projectile.

46. A projectile as in one of the claims 41 to 45 wherein the propellant charge is

contained by the tail portion and provides part of the retaining means.

47. A projectile as in claim 46 wherein the retaining means includes a socket formed in the propellant charge.

48. A projectile as in one of the claims 41 to 47 wherein the sealing means includes a sealing surface on the tail portion that contacts a sealing surface on the head portion of a trailing projectile in the chain.

49. A projectile as in claim 48 wherein the sealing surface forms a seal with the trailing projectile.

50. A projectile as in claim 49 wherein the seal includes adhesive that forms part of the retaining means.

51. A barrel assembly including a barrel containing a chain of projectiles, the chain being held together by frangible couplings between the projectiles, wherein each projectile has a head portion, a tail portion and a sealed propellant charge, and the couplings include retaining means disposed between the tail portion of each leading projectile and the head portion of the respective trailing projectile.

52. An assembly as in claim 51 wherein the retaining means includes complementary spigot means and socket means engaged together.

53. An assembly as in claim 52 wherein the spigot means and socket means are threaded together.

54. An assembly as in claim 52 or 53 wherein the spigot means and socket means are provided on the trailing and leading projectiles respectively.

55. An assembly as in claim 52, 53 or 54 wherein either the spigot or the socket is

frangible.

56. An assembly as in at least one of the claims 51 to 55 wherein the retaining means includes adhesive between the trailing and leading projectiles.

57. An assembly as in at least one of the claims 51 to 56 wherein the coupling is broken by combustion of the propellant charge in the leading projectile.

58. An assembly as in at least one of the claims 51 to 57 wherein the propellant charge is contained in the tail portion of the leading projectile and provides part of the retaining means.

59. An assembly as in claim 58 wherein the retaining means includes a socket formed in the propellant charge.

60. An assembly as in at least one of the claims 51 to 59 formed as a substantially rigid linear arrangement of projectiles with a frangible coupling between each pair of adjacent projectiles.

61. An assembly as in at least one of the claims 51 to 60 wherein the tail portion of the leading projectile and the head portion of the trailing projectile have complementary surfaces that make contact to form a seal around the propellant charge in the leading projectile.

62. An assembly as in at least one of the claims 51 to 61 wherein all of the projectiles are substantially identical.

63. An assembly as in at least one of the claims 51 to 62 wherein the propellant charge in each projectile is ignitable to propel the respective projectile from the barrel of a weapon.

64. An assembly as in at least one of the claims 51 to 63 further including an ignition system for the projectiles.